REMARKS

The remarks presented herein attend to all outstanding issues in the pending Final Office Action of July 12, 2005. Claims 1-39 remain pending in this application, of which claims 1, 15, 24 and 31 are independent. Claim 37 is cancelled.

Rejections under 35 U.S.C. §103

Claims 1, 2, 4-7, 12-16, 19-20, 24-27 and 29-37 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Shimada et al. (JP411332074A) in view of U.S. Patent No. 3,610,861 granted to Storey (hereinafter "Storey").

When applying 35 U.S.C. §103, the following tenets of patent law must be adhered to:

(a) The claimed invention must be considered as a whole;

(b) The references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination;

(c) The references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention; and

(d) Reasonable expectation of success is the standard with which obviousness is determined. MPEP §2141.01, *Hodosh v. Block Drug Co., Inc.*, 786 F.2d 1136, 1134 n.5, 229 USPQ 182, 187 n.5 (Fed. Cir. 1986).

In addition, it is respectfully noted that to substantiate a *prima facie* case of obviousness the initial burden rests with the Examiner who must fulfill three requirements. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicant's disclosure. MPEP § 2143, *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

The present application relates to a system and method for deicing cableways. A high-frequency AC voltage is generated in an electrical conductor that is physically

separated from the cableway. An electromagnetic field (EMF) is created as a result of the high-frequency AC voltage. The EMF causes dielectric heating in ice formed on the cableway. There is substantially no heating of the cableway component.

On the other hand, Shimada, in the English translation of the abstract and the accompanying figure, discloses a method of melting ice and snowfall from an overhead power transmission line 1 by applying high frequency of 2,350 to 2,550 MHz to the overhead power transmission line 1. Shimada discloses that the high frequency current is added to the overhead power transmission line 1 by a 'high frequency applying coil 5' that carries a current from a high frequency transmission circuit 4. Shimada also discloses that power for the high frequency transmission circuit 4 is from the overhead power transmission line via a 'pick up power source 2'. Shimada does not disclose an electrical conductor that is physically separated from the object being deiced.

Storey discloses an induction heating system. The system includes a conveyor for moving workpieces such as metal bars through an induction heating coil.

Storey is presumably cited by the Examiner to show a system where the electrical conductor is not in contact with the surface. However, it has been held that a reference must either be in the field of an applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant is concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). The present invention is related to removal of ice from a cableway to provide enhanced safety. Storey teaches inductive heating of workpieces moving through a coil on a manufacturing conveyor system. Such inductive heating systems are used, for example, to solder, braze, harden and/or melt metals, i.e., for high temperature solid-state applications. In designing a system to melt ice, one would not look to metallurgical applications for guidance. Storey is non-analogous art to the present invention.

Further, there is no motivation to combine Storey and Shimada. A brief search of the internet showed that the maximum frequency for inductive heating applications is about 60 MHz. Shimada discloses a frequency range of 2,350 to 2,550 MHz. The disparate frequency ranges of the two references discourages their combination.

There is no expectation of successfully creating a cableway or powerline de-icing system by combining Shimada and Storey. Storey teaches an inductive heating coil that creates a localized heating zone. Utilizing an inductive heating coil in the apparatus of Shimada, if it could be done, would heat the power transmission line in the immediate vicinity of the coil. The localized heating would be insufficient to remove ice from a length of the power line. As discussed above, neither Shimada nor the present invention heat the power transmission line. According to the invention, an EMF is generated by a high frequency AC voltage, and then transmitted along the length of an electrical conductor. The EMF possesses capacitive AC current which flows through ice and creates resistive/dielectric loss heating within the ice.

Reconsideration of claim 1 is respectfully requested.

Claims 2, 4-7 and 12-14 depend from claim 1 and benefit from like argument. However, these claims have additional features that patentably distinguish over Shimada in view of Storey. For example, claim 2 recites the cableway system component functions as an electrical sink for the alternating electric field. The Examiner has previously asserted that the 'pick up power source part 2' of Shimada operates as a sink. However, nowhere does Shimada disclose this. Neither does Storey disclose an electrical sink. Claim 5 recites an electrical sink, the electrical sink located proximate to the electrical conductor to increase the strength of the alternating electric field at the surface. As argued above, neither Shimada nor Storey disclose or suggest an electrical sink, let alone that the electrical sink is proximate to the electrical conductor to increase the strength of the alternating electric field at the surface. Claim 6 recites the surface is disposed between the electrical conductor and the electrical sink. Claim 7 recites the electrical conductor is disposed at a distance of about from 0 to 30 cm from the electrical sink. As argued above, neither Shimada nor Storey disclose or suggest an electrical sink. Claim 12 recites the cableway system component is a cableway. Neither Shimada nor Storey disclose a cableway. Claim 13 recites the cableway system component is a cableway system tower. The Examiner asserts that Shimada would inherently use a tower to connect the power lines to it. However, Shimada does not disclose or suggest means for removing ice from a tower.

Reconsideration of claims 2, 4-7 and 12-14 is respectfully requested.

Claim 15 recites a system for melting ice on a cableway system component, and includes the following elements:

(a) a first electrical conductor disposed at a distance of about from 0 to 30 cm from the ice wherein a physical space separates the first electrical conductor from the cableway system component, and

(b) an AC power source for providing a high-frequency AC voltage in the first electrical conductor so that the AC voltage generates a high-frequency alternating electric field in the ice.

As discussed above, the combination of Shimada and Storey fails to create an operable cableway or powerline de-icing system, let alone the system of the present invention. A system of Shimada/Storey incorporating a physical space would create inductive heating at a small localized area, or otherwise require a coil around the entire cable – in which case it would be impossible for ice to have formed on a cableway system component. The combination of Shimada and Storey fails to render claim 15 obvious.

Reconsideration of claim 15 is requested.

Claims 16 and 19-20 depend from claim 15 and benefit from like argument. However, these claims have additional features that patentably distinguish over Shimada in view of Storey. For example, claim 16 recites an electrical sink, the electrical sink disposed at a distance of about from 0 to 30 cm from the first electrical conductor to increase the strength of the alternating electric field. As argued above, Shimada does not disclose an electrical sink, let alone that an electrical sink can be located at a distance of about 0 to 30 cm from the first electrical conductor to increase the strength of the alternating electric field. Storey also fails to disclose an electrical sink. Claim 19 recites the ice covers a surface of an object being de-iced, and the electrical sink is integral with the object. As argued above, neither Shimada nor Storey disclose an electrical sink. Further, in Shimada, the object being deiced is a power transmission line, and therefore it cannot include an integral sink as required by claim 19.

Reconsideration of claims 16 and 19-20 is respectfully requested.

Claim 24 recites a method for de-icing a surface of a cableway system component, including a step of applying a high-frequency AC voltage to an electrical conductor that is

located proximate to the surface, to generate a high-frequency alternating electric field that melts ice at the surface, wherein a physical space separates the electrical conductor from the surface. As argued above, Shimada cannot be modified according to Storey to create an operable cableway deicing system. Claim 24 is not rendered obvious by the combination of Shimada and Storey.

Reconsideration of claim 24 is requested.

Claims 25-27 and 29-30 depend from claim 24 and benefit from like argument. However, these claims have additional features that patentably distinguish over Shimada in view of Storey. Claim 25 recites applying high-frequency AC voltage including flowing AC current with a frequency in a range of about from 60 kHz to 100 kHz. Shimada discloses a frequency range of 2,350 to 2,550 MHz (i.e., 2.35-2.55 GHz) which is not in the range 60 kHz - 100 kHz of the immediate application. Claim 26 recites applying AC voltage with a voltage in a range of about from 3 kV to 15 kV. Nowhere does Shimada or Storey disclose an AC voltage, let alone the voltage range of about from 3 kV to 15 kV as required by claim 26. Claim 27 recites separating the electrical conductor from the cableway system component using an electrically insulating spacer. Neither Shimada nor Storey recite an insulating spacer. Claim 29 recites providing an electrical sink, wherein the surface is located between the electrical conductor and the electrical sink. As argued above, neither Shimada nor Storey disclose an electrical sink. Claim 30 recites the cableway system component is electrically conductive and further includes the steps of:

(a) connecting an AC power source to the cableway system component;

(b) connecting the AC power source to the electrical conductor; and

(c) connecting the AC power source to the electrical ground, so that the AC power source energizes the cableway system component and the electrical conductor at the same AC potential but 180 degrees out of phase from each other.

Neither Shimada nor Storey disclose or suggest energizing a cableway system component and an electrical conductor with the same AC potential but 180 degrees out of phase from each other. The combination of Shimada and Storey fails to render claim 30 obvious.

Reconsideration of claims 25-27 and 29-30 is respectfully requested.

Claim 31 recites a method for melting ice on a cableway system component, including an element of applying a high-frequency AC voltage to a first electrical conductor that is located at a distance of about from 0 to 30 cm from the ice, wherein a physical space separates the first electrical conductor from the cableway system component, to generate a high-frequency alternating electric field that melts the ice. As argued above, the combination of Shimada and Storey fails to create an operable cableway deicing system having a physical space separating the first electrical conductor from the cableway system component, as specified by the immediate application. Further, Shimada does not disclose both a first electrical conductor and a cableway system component. Storey also fails to disclose a cableway system component. Shimada and Storey, alone or in combination, fail to disclose every element of Applicants' claim 31 and, for at least this reason, cannot render claim 31 obvious.

Reconsideration of claim 31 is requested.

Claims 32-37 depend from claim 31 and benefit from like argument. However, these claims have additional features that patentably distinguish over Shimada in view of Storey. For example, claim 32 recites applying high-frequency AC voltage including flowing AC current with a frequency in a range of about from 60 kHz to 100 kHz. Shimada discloses a frequency range of 2,350 to 2,550 MHz (i.e., 2.35-2.55 GHz) which is not in the range 60 kHz - 100 kHz of the immediate application. Storey does not disclose a frequency. Claim 33 recites applying AC voltage with a voltage in a range of about from 3 kV to 15 kV. Nowhere does Shimada or Storey disclose applying an AC voltage in a range of about from 3 kV to 15 kV. Claim 34 recites providing an electrical sink within a distance of about from 0 to 30 cm from the first electrical conductor. Nowhere does Shimada or Storey disclose an electrical sink. Claim 35 recites the ice is located between the electrical conductor and the electrical sink. As argued above, neither Shimada nor Storey disclose an electrical sink. Claim 36 recites the ice covers a surface of an object being de-iced, and the electrical sink is integral with the object. As argued above, neither Shimada nor Storey disclose an electrical sink.

Reconsideration of claims 32-37 is respectfully requested.

In view of the above remarks, Applicants contend that claims 1, 2, 4-7,12-16, 19-20, 24-27 and 29-37 are allowable over Shimada in view of Storey. Reconsideration of claims 1, 2, 4-7,12-16, 19-20, 24-27 and 29-37 is respectfully requested.

Claim 8 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Shimada in view of Storey and further in view of Wiseman (U.S. Patent No. 6,043,471).

Wiseman discloses a method for inductively heating a workpiece; the immediate application does not teach or require inductive heating. The immediate application teaches an apparatus and method for melting ice; Storey and Wiseman do not. Therefore, both Storey and Wiseman are non-analogous art to the immediate application; it would not have been obvious to combine Shimada with Storey and/or Wiseman as required under 35 U.S.C. § 103(a). However, even when combined, Shimada, Storey, and Wiseman do not render claim 8 obvious.

Claim 8 depends from claim 1. As argued above, Shimada and Storey lack motivation and an expectation of success, which are necessary to render claim 1 obvious.

Claim 8 recites the cableway system component is electrically conductive and is connected to the AC power source, the electrical conductor is connected to the AC power source, so that the AC power source energizes the cableway system component and the electrical conductor at the same AC potential but 180 degrees out of phase from each other. Neither Shimada, Storey nor Wiseman disclose or suggest energizing the cableway system component and the electrical conductor at the same AC potential but 180 degrees out of phase from each other.

The Examiner asserts that Wiseman discloses a heating system with phase control in which MOSFET Q3 is 180 degrees out of phase with respect to MOSFET Q2. However, "when MOSFET Q3 is 180 degrees out of phase with respect to MOSFET Q2, MOSFET Q3 will be off the entire half cycle that MOSFET Q2 is on, and no pulse will be applied to the primary of transformer T1. Again, MOSFET Q4 will also be 180 degrees out of phase with respect to MOSFET Q1, an no pulse will be provided on the other half cycle" (col. 6, lines 28-34). When no electricity is pulsed through transformer T1, no electricity exits Wiseman's inverter and his inductive heating device is left unpowered, and thus inoperable. Wiseman is not advocating the use of 180 degree out of phase electricity.

Reconsideration of claim 8 is respectfully requested.

Claims 3, 9-10, 17-18, 25-26, and 28-37 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Shimada in view of Storey.

As argued above, Shimada and Storey fail to render claim 1 obvious. Claim 3 depends indirectly from claim 1, argued above, and further recites the cableway system component is connected to electrical ground. The Examiner asserts that connecting the system components to electrical ground is conventional in the art. Contrary to the Examiner's assertion, it is not obvious to connect a power transmission line to ground. In fact, if the power transmission line of Shimada is connected to ground, not only is deicing not possible, the fundamental operation of the power transmission line is inhibited. Combining Storey with Shimada does nothing to overcome the difficulties outlined above. The combination of Shimada and Storey fails to render claim 3 obvious.

Claim 9 recites the AC power source provides high-frequency AC voltage with a frequency in a range of about from 60 kHz to 100 kHz. Shimada discloses a frequency range of 2,350 to 2,550 MHz (i.e., 2.35-2.55 GHz) which is not in the range 60 kHz - 100 kHz of the immediate application. See at least: page 3, lines 13-15; page 4, lines 8-10; page 6, lines 20-21; and page 7, lines 9-10. It is not obvious to adjust a frequency from a gigahertz range to a kilohertz range to melt ice. Further, there is no motivation to modify the frequency of Shimada, since it already operates to melt ice from the power transmission line. Storey does not disclose a frequency for AC voltage.

Claim 10 depends from claim 1 and recites the AC power source provides high-frequency AC voltage with a voltage in a range of about from 3 kV to 15 kV. Neither Shimada nor Storey disclose or suggest a voltage range. In fact, the voltage range of Shimada is probably dependent upon operation of the power transmission line, and therefore not selectable. The combination of Shimada and Storey fails to render claim 10 obvious.

Claim 17 depends from claim 16 and recites the electrical sink is connected to electrical ground. As argued above, neither Shimada nor Storey disclose or suggest an electrical sink. Further, if as asserted by the Examiner in paragraph 2 of the previous office action, system component 2 of Shimada functions as a sink, connecting system component 2 to ground effectively short circuits power transmission line 1 to ground.

Storey does not disclose an electrical sink. The combination of Shimada and Storey fails to render claim 17 obvious.

Claim 18 depends from claim 17 and recites the ice is disposed between the first electrical conductor and the electrical sink. As argued above, neither Shimada nor Storey disclose an electrical sink and the combination therefore cannot render claim 18 obvious. Claim 25 recites applying high-frequency AC voltage including flowing AC current with a frequency in a range of about from 60 kHz to 100 kHz. Shimada discloses a frequency range of 2,350 to 2,550 MHz (i.e., 2.35-2.55 GHz) which is not in the range 60 kHz - 100 kHz, and it is not obvious to adjust a frequency from a gigahertz range to a kilohertz range to melt ice. Storey fails to disclose an AC current frequency. Claim 26 depends from claim 24 and recites applying AC voltage with a voltage in a range of about from 3 kV to 15 kV. Neither Shimada nor Storey disclose a voltage range at all and the combination therefore cannot render claim 26 obvious. Claim 28 depends from claim 24 and recites connecting the cableway system component to electrical ground. As argued above, the cableway system component has a surface from which ice is removed. Thus, in the system of Shimada, the power transmission line, from which ice is melted, would be required to be connected to ground and this is clearly not reasonable, as this would prevent transmission of power through the power transmission line. Combining Storey with Shimada does nothing to overcome this argument. Claim 29 depends from claim 24 and recites providing an electrical sink, wherein the surface is located between the electrical conductor and the electrical sink. The Examiner asserts, in paragraph 2 of the previous office action, that Shimada's system component 2 functions as an electric sink. Respectfully we disagree. Storey does not disclose an electrical sink. Claim 30 recites the cableway system component is electrically conductive and further includes the steps of connecting an AC power source to the cableway system component, connecting the AC power source to the electrical conductor, and connecting the AC power source to the electrical ground, so that the AC power source energizes the cableway system component and the electrical conductor at the same AC potential but 180 degrees out of phase from each other. Neither Shimada nor Storey disclose a cableway system component and the combination cannot therefore suggest energizing a cableway system component and an

electrical conductor with the same AC potential but 180 degrees out of phase from each other.

Claim 31 recites a method for melting ice on a cableway system component, including an element of applying a high-frequency AC voltage to a first electrical conductor that is located at a distance of about from 0 to 30 cm from the ice, wherein a physical space separates the first electrical conductor from the cableway system component, to generate a high-frequency alternating electric field that melts the ice. As argued above, modifying Shimada according to Storey would not create a system with a high-frequency alternating electric field that melts ice. Claim 32 recites applying high-frequency AC voltage including flowing AC current with a frequency in a range of about from 60 kHz to 100 kHz. Shimada discloses a frequency range of 2,350 to 2,550 MHz (i.e., 2.35-2.55 GHz) which is not in the range 60 kHz - 100 kHz, and it is not obvious to adjust a frequency from a gigahertz range to a kilohertz range to melt ice. Storey fails to recite an AC current frequency. Claim 33 recites applying AC voltage with a voltage in a range of about from 3 kV to 15 kV. Neither Shimada nor Storey disclose a voltage range at all and the combination therefore cannot render claim 33 obvious. Claim 34 recites providing an electrical sink within a distance of about from 0 to 30 cm from the first electrical conductor. Neither Shimada nor Storey disclose an electrical sink. Claim 35 recites the ice is located between the electrical conductor and the electrical sink. Again, neither Shimada nor Storey disclose an electrical sink. Claim 36 recites the ice covers a surface of an object being deiced, and the electrical sink is integral with the object. As argued above, neither Shimada nor Storey disclose an electrical sink. Further, since in the system of Shimada, the ice forms on a power transmission line, an electrical sink cannot be integral with the power transmission line.

In view of the above remarks, Applicants contend that claims 3, 9-10, 17-18, 25-26 and 28-37 are allowable over Shimada in view of Storey. Reconsideration of claims 3, 9-10, 17-18, 25-26 and 28-37 is respectfully requested.

Claims 21, 27 and 39 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Shimada in view of Storey and further in view of Dey (U.S. Patent No. 4,409,428).

Dey discloses an optical fiber joint for an overhead electric transmission system. The disclosure of Dey relates more to that of Shimada than to the immediate application. Dey does not teach or suggest melting of ice and is non-analogous art that is not in the field of Applicants' endeavor or reasonable pertinent to the problem with which the Applicants are concerned. However, when combined, Shimada, Storey and Dey do not render claim 21 obvious.

Claim 21 depends from claim 15 and recites a second electrical conductor connected to the AC power source, wherein the first electrical conductor is connected to the AC power source, so that the AC power source energizes the first electrical conductor and the second electrical conductor at the same AC potential but 180 degrees out of phase from each other. None of Shimada, Storey or Dey disclose or suggest energizing a first and second electrical conductor at the same AC potential but 180 degrees out of phase from each other. For at least this reason, Shimada, Storey and Dey, alone or in combination, fail to disclose every element of Applicants' claim 21.

Claim 27 depends from claim 24 and further recites the step of separating the electrical conductor from the cableway system component using an electrically insulating spacer. There is no suggestion or motivation in the references or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine reference teachings to render the instant invention obvious. As discussed above, modifying Shimada according to Storey by inserting a physical space or insulating spacer would not produce an operable cableway or powerline de-icing system. Shimada, Storey and Dey, alone or in combination, fail to render claim 27 obvious.

Claim 39 depends from claim 31 and recites the steps of applying the AC voltage to a second electrical conductor 180 degrees out of phase from the first electrical conductor so that an AC power source energizes both the first and second electrical conductors. None of Shimada, Storey or Dey disclose or suggest energizing a first and second electrical conductor at the same AC potential but 180 degrees out of phase from each other. For at least this reason, Shimada, Storey and Dey, alone or in combination, fail to disclose every element of Applicants' claim 39.

In view of the above remarks, Applicants contend that claims 21, 27 and 39 are allowable over Shimada in view of Storey and further in view of Dey. Reconsideration of claims 21, 27 and 39 is respectfully requested.

Conclusion

In view of the above Remarks, Applicants have addressed all issues raised in the Final Office Action dated July 12, 2005, and respectfully solicit a Notice of Allowance. Should any issues remain, the Examiner is encouraged to telephone the undersigned attorney. Authorization to charge fees associated with a Request for Continued Examination and a one-month extension of time are submitted herewith. If any additional fee is deemed necessary in connection with this Response, please charge Deposit Account No. 12-0600.

Respectfully submitted,

Date: 9 Nov 2005

By: [signature]

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